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Editorial

Special Issue on Maternal Obesity:

Tackling maternal obesity: building an evidence base to reflect the complexity of lifestyle behaviour change

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Our call for this special issue on maternal obesity encouraged submissions to present a range of perspectives on this complex health area, from public health interventions through to support for individual lifestyle behaviour change, views of women and factors likely to influence and impact on the obesogenic environment. The need for effective interventions is clear. Increasing obesity rates are among the greatest public health challenges of the 21st century (Raymond et al., 2014) with obesity prevalence among women when they become pregnant mirroring those in the general population (Valsamakis et al., 2015). As the greatest increase in weight gain in women occurs during their childbearing years (Bogaerts et al., 2017), the perinatal period could be considered as a 'weight promoting' life stage.

Evidence linking maternal obesity with adverse maternal and infant outcomes is increasing (Marchi et al., 2015). Currently, around a quarter to a third of women in high income countries such as the USA, the UK and Australia are overweight or obese when they become pregnant (Marchi et al 2015). Obesity in pregnancy is placing a considerable burden on healthcare services and resources (Morgan et al., 2015). Data from a health economic framework developed using US costing data to provide an insight into the short-term health economic impacts of maternal overweight, gestational diabetes mellitus (GDM) and fetal macrosomia identified annual healthcare costs of more than $1.8 billion, without taking any longer-term consequences into account (Lenoir-Wijnkoop et al 2015).

As most women who commence pregnancy with a normal BMI exceed current recommendations for gestational weight gain (GWG) and retain on average 2kg – 5 kg of weight during each subsequent pregnancy (Goldstein et al., 2016, Chu et al., 2009, Fraser et al., 2011), excess GWG and postpartum weight retention are as much a cause for concern as pre-conception obesity. Excess GWG increases a woman's risk of pregnancy and postnatal complications, including GDM and caesarean birth (Oken et al., 2009, Rasmussen and Yaktine, 2009, Ramachenderan et al., 2008, McGuire et al., 2010, Guelinckx et al., 2008, Guelinckx et al., 2010) and adversely impacts on her infant's health (Einerson et al., 2011, Siega-Riz et al., 2009). Furthermore, postpartum weight retention is associated with subsequent maternal overweight and obesity (Rooney et al., 2005, Shrewsbury et al., 2009) cardiovascular disease (Rooney et al., 2005, Willett et al., 1995) and related morbidity.

Efforts to tackle maternal obesity need to span the perinatal period, however evidence of barriers to optimise maternal weight management (van der Pligt et al., 2013, Seneviratne et al., 2015, Callaway et al., 2009) highlight the priority to understand which strategies are likely to be effective, for which women, and when implementation should occur to achieve optimal outcomes.

This special issue includes peer reviewed papers from multi-disciplinary research groups and commentaries from leading researchers in this area (Poston 2017, Dodd and Briley 2017). Evidence presented includes women's and partner's perceptions of obesity, views and experiences of dietetic care, motives for lifestyle change, and patterns of postnatal weight retention. Referral pathways, lifestyle interventions, systems approaches to obesity prevention utilising principles of social marketing and maternal dietary changes are some of the areas described, while our commentaries consider research, policy and advice to women (Poston 2017) and obstetric and midwifery perspectives on managing obesity in the absence of robust evidence (Dodd and Briley 2017).

How do included papers contribute to the evidence?

Hill and colleagues (2017) in a study from Australia describe pre-conception as an optimal time to influence maternal weight and target obesity prevention interventions, offering important insights into why studies aimed at limiting GWG during pregnancy have had mixed results to date. They propose that identification of barriers to women managing their weight during pregnancy could inform a 'systems approach' which integrates the needs of women and reflects the environment in which they live to better target obesity prevention (Hill et al 2017).

In their review of studies assessing dietary intake change from pre-conception to pregnancy, Hillier and Olander (2017) suggest that to develop weight focussed interventions, insight is needed into how women alter their dietary intake in pregnancy. With wide variation among included studies in dietary assessment and measurement approaches, the reviewers report wide study heterogeneity. Although significant increases in fruit and vegetable consumption were found, women still failed to meet national recommendations for daily dietary intake in pregnancy (de Jersey et al., 2013).

Included papers contribute to the evidence that obese women's experiences of their maternity care vary widely. Willcox et al (2017) surveyed pregnant women in Australia following their first antenatal visit to explore their knowledge of, and attitudes towards, gestational weight guidance. Comparable with findings of an earlier study by Groth and Kearney (2009), women wanted more information on pregnancy weight management but were often offered advice inconsistent with national guidelines. In contrast, Swift et al (2017) found that women in the UK changed their dietary intake and activity behaviour in response to physical cues rather than advice from health professionals.

Evidence of women's feelings and attitudes towards their weight management highlight the stigma some women feel. Heslehurst et al (2017), Atkinson and McNamara (2017) and Lingetun et al (2017) explored women's 'lived experiences' of being obese and pregnant. Heslehurst et al (2017) recruited women who had BMIs ≥ 30 kg/m^2 who attended specialist antenatal dietetic services, while Atkinson and McNamara (2017) recruited postnatal women. Heslehurst et al (2017) in a UK study reported women were satisfied with a service that offered tailored and individualised weight management support. Atkinson and McNamara (2017) in a study from Ireland reported that although women's weight was checked and documented in their maternity records, it was ignored by clinicians, resulting in women feeling anxious and confused. Lingetun et al (2017) from Sweden explored the content of blogs written by overweight and obese women to explore their feelings about being pregnant. They found that pregnancy 'normalised' women's weight, and that the advice women were offered by midwives on risks of obesity was received more critically as a consequence. The contrast between how services in different countries tackled maternal obesity illustrates the

potential impact on women's experiences if their weight management is addressed within the context of tailored and personalised care.

Daemers et al (2017) in a study of antenatal contacts in the Netherlands report that obese women were as satisfied with their antenatal care as women with a normal BMI, and they were just as likely to attend planned contacts. Jarvie (2017) offers a previously ignored insight into the financial burden obese pregnant women who have GDM have to face. Women described having to pay for additional childcare support to attend more frequent clinic appointments and purchase more expensive foods if placed on a diabetic diet, issues unlikely to be considered by clinicians responsible for antenatal care and providing an insight into some of the economic consequences of obesity for individual women.

The paper by Keely et al (2017) offers a unique and novel exploration of the experiences of obese pregnant women and their partners. This UK based study illustrated that couple's views were similar, but not concurrent with healthy lifestyle advice. The authors offer insights into how couples dealt with messages about healthy eating in pregnancy, resisted stigma about being obese, and rationalised their weight management approaches. Although routine weighing of women attending antenatal contacts in Ireland ceased in the early 1990's, Allen-Walker et al (2017) found pregnant women still expected to be weighed. Their findings of women's views of being routinely weighed support an Australian survey of women who took part in a trial comparing routine pregnancy weighing with standard care, which found intervention group women were satisfied with being weighed and did not experience any anxieties about this (Brownfoot et al 2016).

Atkinson et al (2017) report on findings from a qualitative study of midwives' experiences of referring pregnant women to weight management services. Most midwives welcomed being able to refer women as they believed the service offered evidence-based care and advice. However some midwives were unaware of the service, had limited information about the service or were reluctant to discuss it with obese women. McParlin et al (2017) used questionnaires to investigate midwives' use of physical activity guidelines with obese pregnant women. Midwives' confidence in discussing physical activity varied, highlighting the need for further education if midwives are to feel confident about offering appropriate support on lifestyle behaviour change. Warren et al (2017) found that pregnant women in Wales who had a normal BMI responded well to an intervention to promote a healthy eating and exercise lifestyle in pregnancy to support weight management using motivational interviewing and personalised goal setting.

Two studies explored the impact of midwives caring for obese pregnant women, and 'messages' that this could convey about body size during antenatal contacts. Hodgson et al (2017) found that despite being aware of the potential to be viewed by women as 'judgemental', midwives perceived women with high BMIs as 'less health conscious'. Roberts (2017) explored midwives' and students midwives' experiences of caring for obese women. Obese midwives found it easier to communicate with obese pregnant women than women of normal BMI. This study also highlighted the anxiety and concern midwives' may experience when caring for women with complex health needs.

Evidence on postnatal interventions is developing, with systematic reviews reporting that interventions which combined diet and physical activity components were more likely to be successful (van der Pligt et al., 2013, Amorim et al., 2007). Vincze et al (2017) explored motivators for healthy eating and physical activity among women in Australia who had given birth in the previous five years. Improved health and mood were the most prevalent motivators for weight management change, with three quarters of their sample of 874 women reporting weight loss attempts via at least one strategy during the previous two years. Despite postpartum women being perceived as a challenging group to recruit to lifestyle intervention programmes, women were

motivated to achieve a healthy weight. The postnatal period is currently a 'missed' opportunity to support women to achieve better longer-term health (Bick et al 2015).

While successful weight management and interventions differ in their design, approaches to and timing of implementation across maternal BMI groups, Bogaerts et al (2017) in a study from Belgium found that excessive GWG and early postpartum weight retention affected not only women who were overweight or obese pre pregnancy, but women who had a normal BMI. Lean women who experienced excess GWG retained most weight at six months postpartum compared to overweight or obese women, reiterating the important message that strategies targeting weight management across the perinatal period should include all women, regardless of pre-pregnancy BMI.

The findings of included studies have implications for healthcare professionals involved in the care of women during their reproductive years but particularly highlight the important role midwives can play as outlined by Lucilla Poston in her commentary (Poston 2017). Focus on the pre-conception period could provide greater opportunities for success in achieving and sustaining positive lifestyle change, but evidence to support practice is needed as Dodd and Briley (2017) reiterate. Interventions that utilise public health theories and social marketing principles could inform the future development and implementation of complex interventions, reflecting the input of a range of experts, including women, clinician, psychologists, sociologists, public health specialists, policy makers, food manufacturers, agriculturalists and economists. Our developing understanding of the 'social pathway to obesity' (Sutherland et al 2013) indicates that perspectives outside of immediate healthcare are needed to tackle obesity across a woman's life-course, including during her reproductive years.

Compassion and understanding of women's anxieties about their weight during and after pregnancy are important messages. High quality, accessible information with content tailored to meet women's individual needs in a non-stigmatising and practical way is important, including family oriented information to enable influences from close relationships to be utilised. The perinatal period remains a challenging time to halt intergenerational effects of maternal obesity, but it is preventable. We hope the evidence presented in this issue will inform the future content, implementation and evaluation of effective interventions, including clinical management, based on high quality evidence of benefit.

References

ABRAMS, B., ALTMAN, S. L. & PICKETT, K. E. 2000. Pregnancy weight gain: still controversial. *The American Journal Of Clinical Nutrition,* 71**,** 1233S-1241S.

Allen-Walker, V., Mullaney, L., Turner, M.J., Woodside, J., Holmes, V., McCartney, D.M., McKinley, M.C. (2017) How do women feel about being weighed during pregnancy? A qualitative exploration of the opinions and experiences of postnatal women. Midwifery

AMORIM, A. R., LINNE, Y. M. & LOURENCO, P. M. 2007. Diet or exercise, or both, for weight reduction in women after childbirth. *Cochrane database of systematic reviews (Online)***,** CD005627.

Atkinson, L., French, D.P., Menage, D., Olander, E.K. (2017) Midwives' experiences of referring obese women to either a community or home-based antenatal weight management service: Implications for service providers and midwifery practice. Midwifery

Atkinson, S., McNamara, P.M. (2017) Unconscious collusion: An interpretative phenomenological analysis of the maternity care expereinces of women with obesity (BMI > 30 kg/m^2) Midwifery

Bick D, MacArthur C, Knight M, Nelson-Piercy C, Shakespeare J (2015). Post-pregnancy care: missed opportunities during the reproductive years. Chapter 8 in: Annual Report of the Chief Medical Officer, 2014.

BOGAERTS, A., DE BAETSELIER, E., AMEYE, L., DILLES, T., VAN ROMPAEY, B. & DEVLIEGER, R. 2017. Postpartum weight trajectories in overweight and lean women. *Midwifery*.

BRENNAND, E. A., DANNENBAUM, D. & WILLOWS, N. D. 2005. Pregnancy outcomes of first nations women in relation to pregravid weight and pregnancy weight gain. *Journal of Obstetrics & Gynaecology,* 27**,** 936 - 944.

Brownfoot FC, Davey M-A, Kornman L. 2016 Women's opinions on being weighed at routine antenatal visits. BJOG;123:263–270.

CALLAWAY, L. K., O'CALLAGHAN, M. J. & MCINTYRE, H. D. 2009. Barriers to addressing overweight and obesity before conception. *Med J Aust,* 191**,** 425-428.

CHU, S. Y., CALLAGHAN, W. M., BISH, C. L. & D'ANGELO, D. 2009. Gestational weight gain by body mass index among US women delivering live births, 2004-2005: fueling future obesity. *American Journal of Obstetrics and GYnecology,* 200**,** 271; e1-7.

Daemers, D.O., van Limbeek, E.B., Bude, L.M., Wijnen, H.A., Nieuwenhuijze, M.J., de Vries, R.G. (2017) The use of midwife-;ed primary prenatal care by obese women in the Netherlands; an explorative cohort study. Midwifery

DE JERSEY, S. J., NICHOLSON, J. M., CALLAWAY, L. K. & DANIELS, L. A. 2013. An observational study of nutrition and physical activity behaviours, knowledge, and advice in pregnancy. *BMC pregnancy and childbirth,* 13**,** 115.

Dodd JM, Briley AL. Managing obesity in pregnancy – an obstetric and midwifery perspective. Midwifery 2017

EINERSON, B. D., HUFFMAN, J. K., ISTWAN, N. B., RHEA, D. J. & JOY, S. D. 2011. New Gestational Weight Gain Guidelines: An Observational Study of Pregnancy Outcomes in Obese Women. *Obesity,* 19**,** 2361 - 2364.

FRASER, A., TILLING, K., MACDONALD-WALLIS, C., HUGHES, R., SATTAR, N., NELSON, S. M. & LAWLOR, D. A. 2011. Associations of gestational weight gain with maternal body mass index, waist circumference, and blood pressure measured 16 y after pregnancy: the Avon Longitudinal Study of Parents and Children (ALSPAC). *The American Journal Of Clinical Nutrition,* 93**,** 1285-1292.

GALTIER-DEREURE, F., BOEGNER, C. & BRINGER, J. 2000. Obesity and pregnancy: complications and cost. *Am J Clin Nutr,* 71**,** 1242S - 1248S.

GOLDSTEIN, R., TEEDE, H., THANGARATINAM, S. & BOYLE, J. 2016. Excess Gestational Weight Gain in Pregnancy and the Role of Lifestyle Intervention. *Semin Reprod Med,* 34**,** e14-e21.

GUELINCKX, I., DEVLIEGER, R., BECKERS, K. & VANSANT, G. 2008. Maternal obesity: pregnancy complications, gestational weight gain and nutrition. *Obesity Reviews,* 9**,** 140-150.

GUELINCKX, I., DEVLIEGER, R., MULLIE, P. & VANSANT, G. 2010. Effect of lifestyle intervention on dietary habits, physical activity, and gestational weight gain in obese pregnant women: a randomized controlled trial. *Am J Clin Nutr,* 91**,** 373-380.

Groth, S. W., Kearney, M. H., 2009. Diverse women's beliefs about weight gain in

pregnancy. J Midwifery Wom Heal 54, 452-457.

Heslehurst, N., Dinsdale, S., Brandon H., Johnston, C., Summerbell, C., Rankin, J. (2017) Lived experinces of routine antenatal dietetic services among women with obesity: a qualitative phenomenological study. Midwifery

Hill, B., McPhie, S., Moran, L.J., Harrison, P., Huang, T, T-K, Teede, H., Skouteris, H. (2017) Lifestyle intervention to prevent obesity duringpregnancy: Implicatins and recommendations for research and implementation. Midwifery

Hiller, S., Olander, E.K. (2017) Women's dietary changes before and during pregnancy; a systematic review. Midwifery

Hodgson, E.L., Smith, D., Hare, D.J., Wittkowski, A. (2017) The attitudes of pregnant women and midwives towards raised BMI in a maternity setting; A discussion of two repertory grid studies. Midwifery

Jarvie, R., (2017) Lived experiences of women with co-existing BMI > 30 and gestational diabetes mellitus. Midwifery

Keely, A., Cunningham-Burley, S., Elliott, L., Sandall, J., Whittaker, A. (2017) "If she wants to eat …. and eat, and eat …. fine! It's gonna feed the baby": women and partner's perceptions and experiences of pregnancy with a BMI > 40 kg/m^{2}. Midwifery

Lenoir-Wijnkoop I, van der Boek EM, Garssen J, Nuijten MJC, Uauy RD. (2015) health economic modelling to assess short-term costs of maternal overweight, gestational diabetes, and related macrosomia - a pilot evaluation. Front Phaarmacol. 6:103Front Pharmacol. 2015; 6: 103.

Lingetun, L., Fungbrant, M., Claesson, I-M., Baggens, C. (2017) 'I just want to be normal' - A qualitative study of pregnant women's blogs who present themselves as overweight or obese. Midwifery

MARCHI, J., BERG, M., DENCKER, A., OLANDER, E. K. & BEGLEY, C. 2015. Risks associated with obesity in pregnancy, for the mother and baby: a systematic review of reviews. *Obesity Reviews,* 16**,** 621-638.

MARTIN, J., MACDONALD-WICKS, L., HURE, A., SMITH, R. & COLLINS, C. 2015. Reducing Postpartum Weight Retention and Improving Breastfeeding Outcomes in Overweight Women: A Pilot Randomised Controlled Trial. *Nutrients,* 7**,** 1464.

MCGUIRE, W., DYSON, L. & RENFREW, M. 2010. Maternal obesity: consequences for children, challenges for clinicians and carers. *Seminars in Fetal and Neonatal Medicine,* 15**,** 108-112.

McParlin, C., Bell, R., Robson, S.C., Muirhead, C.R., Araujo-Soares, V. (2017) What helps or hinders to implement physcial activity guidelines for obese pregnant women? A questionnaire survey using the Theoretical Domains Framework. Midwifery

Morgan KL, Rahman MA, Hill RA, Khanon A, Lyons RA, Brophy ST (2015) Obesity in pregnancy; infant health service utilisation and costs on the NHS. BMJ Open 5;e008357.

MUKTABHANT, B., LAWRIE, T. A., LUMBIGANON, P. & LAOPAIBOON, M. 2015. Diet or exercise, or both, for preventing excessive weight gain in pregnancy. *The Cochrane Library*.

OKEN, E., KLEINMAN, K. P., BELFORT, M. B., HAMMITT, J. K. & GILLMAN, M. W. 2009. Associations of Gestational Weight Gain With Short- and Longer-term Maternal and Child Health Outcomes. *American Journal of Epidemiology,* 170**,** 173-180.

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Swift, J.A., Langley-Evans, S.C., Pearce, J., Jethwa, P.H., Taylor, M.A., Avery, A., Ellis, S., McMullen, S., Elliott-Sale, K.J. (2017) Antenatal weight management: Diet, physical activity, and gestational weight gain in early pregnancy. Midwifery

RAMACHENDERAN, J., BRADFORD, J. & MCLEAN, M. 2008. Maternal obesity and pregnancy complications: A review. *Australian and New Zealand Journal of Obstetrics and Gynaecology,* 48**,** 228-235.

RASMUSSEN, K. & YAKTINE, A. E. 2009. Weight Gain during Pregnancy: Reexamining the Guidelines *National Academic Press: National Academy of Sciences.* USA

RAYMOND, J. E., FOUREUR, M. J. & DAVIS, D. L. 2014. Gestational weight change in women attending a group antenatal program aimed at addressing obesity in pregnancy in New South Wales, Australia. *Journal Of Midwifery & Women's Health,* 59**,** 398-404.

ROONEY, B. L., SCHAUBERGER, C. W. & MATHIASON, M. A. 2005. Impact of Perinatal Weight Change on Long-Term Obesity and Obesity-Related Illnesses. *Obstetrics & Gynecology,* 106**,** 1349-1356

SENEVIRATNE, S. N., MCCOWAN, L. M. E., CUTFIELD, W. S., DERRAIK, J. G. B. & HOFMAN, P. L. 2015. Exercise in pregnancies complicated by obesity: achieving benefits and overcoming barriers. *American Journal of Obstetrics and Gynecology,* 212**,** 442-449.

SHREWSBURY, V., ROBB, K., POWER, C. & WARDLE, J. 2009. Socioeconomic differences in weight retention, weight-related attitudes and practices in postpartum women. *Maternal & Child Health Journal,* 13**,** 231-240.

SIEGA-RIZ, A. M., VISWANATHAN, M., MOOS, M.-K., DEIERLEIN, A., MUMFORD, S., KNAACK, J., THIEDA, P., LUX, L. J. & LOHR, K. N. 2009. A systematic review of outcomes of maternal weight gain according to the Institute of Medicine recommendations: birthweight, fetal growth, and postpartum weight retention. *American Journal of Obstetrics and Gynecology,* 201**,** 339.e1-339.e14.

Sutherland G, Brown S, Yelland J (2012) Applying a social disparities lens to obesity in pregnancy to inform efforts to intervene Midwifery. 29:338-343.

VALSAMAKIS, G., KYRIAZI, E. L., MOUSLECH, Z., SIRISTATIDIS, C. & MASTORAKOS, G. 2015. Effect of maternal obesity on pregnancy outcomes and long-term metabolic consequences. *Hormones (Athens, Greece),* 14**,** 345-357.

VAN DER PLIGT, P., WILLCOX, J., HESKETH, K. D., BALL, K., WILKINSON, S., CRAWFORD, D. & CAMPBELL, K. 2013. Systematic review of lifestyle interventions to limit postpartum weight retention: implications for future opportunities to prevent maternal overweight and obesity following childbirth. *Obesity Reviews,* 14**,** 792-805.

Vincze, L., Rollo, M., Hutcheson, M., Burrows, T., MacDonald-Wicks, L., Blumfield, M., Collins, C. (2017) Midwifery

Warren, L., Rance, J., Hunter, B. (2017) Eat Well Keep Active: Qualitative findings from a feasibility and acceptability study of a brief midwife led intervention to facilitate healthful dietary and physical activity behaviours in pregnant women. Midwifery

WHITEMAN, V. E., SALEMI, J. L., MEJIA DE GRUBB, M. C., ASHLEY CAIN, M., MOGOS, M. F., ZOOROB, R. J. & SALIHU, H. M. 2015. Additive effects of pre-pregnancy body mass index and gestational diabetes on health outcomes and costs. *Obesity,* 23**,** 2299-2308.

Willcox, J., Ball, K., Campbell, K.J., Crawford, D., Wilkinson, S.A. (2017) Correlates of pregnant women's gestational weight gain knowledge. Midwifery

WILLETT, W. C., MANSON, J. E., STAMPFER, M. J., COLDITZ, G. A., ROSNER, B., SPEIZER, F. E. & HENNEKENS, C. H. 1995. Weight, Weight Change, and Coronary Heart Disease in Women. *JAMA: The Journal of the American Medical Association,* 273**,** 461-465.